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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/750,796	12/31/2003	Charles John Freeman	7323	1797

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EXAMINER	
LAZORCIK, JASON L	
ART UNIT	**PAPER NUMBER**
1791	
MAIL DATE	**DELIVERY MODE**
11/06/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/750,796	FREEMAN, CHARLES JOHN	
	Examiner	Art Unit	
	Jason L. Lazorcik	1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 September 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3 and 5-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3 and 5-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

The request for a continued prosecution application (CPA) under 37 CFR 1.53(d) filed on [1] is acknowledged. 37 CFR 1.53(d)(1) was amended to provide that the CPA must be for a design patent and the prior application of the CPA must be a design application that is complete as defined by 37 CFR 1.51(b). See *Elimination of Continued Prosecution Application Practice as to Utility and Plant Patent* Applications, final rule, 68 *Fed. Reg.* 32376 (May 30, 2003), 1271 *Off. Gaz. Pat. Office* 143 (June 24, 2003). Since a CPA of this application is not permitted under 37 CFR 1.53(d)(1), the improper request for a CPA is being treated as a request for continued examination of this application under 37 CFR 1.114.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims **1-3, and 5-16** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, Applicants claim amendment lines 7-8 recites limitations drawn to a "predetermined" range or level. The precise metes and bounds that constitute a "predetermined" range are neither clear nor definite, therefore the particular metes and bounds for which Applicant seeks patent protection are likewise rendered unclear and indefinite. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-3, and 5-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bell (US 3,278,844) in view of Northrup (1,144,776) and Varrasso (US 4,780,120) and further in view of the evidentiary reference to Pietenpol et al. ("surface tension of Molten Glass", Physics v.7, 1936, pp 26-31). Note, the Pietenpol reference is pointed to solely to establish properties which are deemed implicit or inherent in the other cited prior art references.

Briefly, Bell teaches of a device for use in measuring the electrical resistivity of molten glass in-situ while Northrup is directed to a resistometer with particular relevance to that claimed in the instant application.

As set forth in the previous Office Actions dated December 5, 2006 and May 10, 2007, Bell teaches that "the resistivity of molten glass is a function of both composition and temperature. If the temperature of molten glass in a forehearth is maintained

constant, changes in resistivity are indicative of composition changes and can be utilized to detect and control such changes...(and) for certain glass compositions,...variations in resistivity are indicative of changes in viscosity and may therefore be utilized in controlling variation in gob size." (Column 1, Lines 14-32).

In short, the Bell is understood to disclose a method for controlling at least one parameter, or alternately "a plurality of parameters", in a molten glass operation by monitoring the electrical resistance of the molten glass with "at least one pair of electrodes". Bell specifically cites control over composition and "in addition" the temperature of for example a borosilicate melt.

Although the instant reference does not explicitly set forth all of the details, the disclosed process, which measures resistivity of molten glass in a forehearth, is implicitly understood to encompass the claimed procedure of melting a raw material in the furnace to form the molten glass. As clearly recited in the excerpt above, Bell applies the measured resistivity to control the composition (e.g. by altering he composition of the raw material used to form the molten glass) or the temperature (e.g. the amount of heat provided to the molten glass) and therefore the viscosity of the molten bath. Both control operations are understood to control "a characteristic of the molten glass".

Further, Bell teaches (See figures 1 and 2, and a sensor comprising an inner (14) and outer (13, 15 and 16) electrode arrangement with a non-conductive spacer element (17). Bell is however silent regarding the specific details of the claimed sensor design

which comprises an inner tube connected to a first electrode and an outer tube connected to a second electrode. Bell is further silent regarding Applicants particular limitation wherein the sensor extends down into the melt from a position above the molten glass.

With respect to the latter limitation, it is the Examiners position absent any compelling and unexpected results to the contrary that it would have been obvious to mount the Bell sensor apparatus in any convenient orientation as deemed optimal for the end user application. For example, it would have been obvious to one or ordinary skill to mount the sensor from a position in the tank above the melt for downward extension into the melt [**Claim 16**] in order to facilitate periodic cleansing of the melt tank walls and floor. Although not here relied upon, similar geometries are known and have been documented in the art (see Berg US 4,603,980).

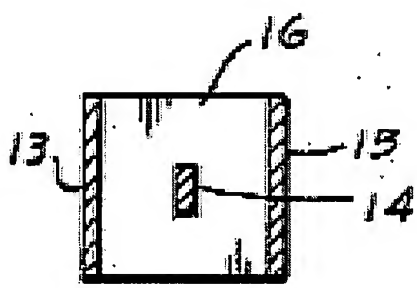
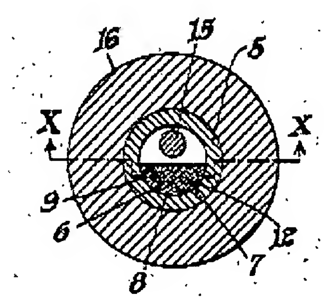


FIG.2.



Next with respect to the particular details of the sensor design, Northrup teaches an apparatus for measuring temperature and resistivity "particularly of a molten material" by passing current there through. In similar fashion to the Bell apparatus, the temperature of the molten material is determined by measuring its resistance (Page 1,

lines 19-27). With particular attention to the resistometer configuration displayed in the instant reference figure 3 and the cross-sectional diagram from the instant figure 2 (see excerpt figure above right), Northrup teaches a sensor disclosing essentially every element as presently claimed. Specifically, the reference teaches a sensor comprising an inner tube (6) connected to a first electrode (9) and an outer tube (5) connected to a second electrode (15). The inner (6) and outer (5) tubes are spaced apart by a refractory or ceramic cement (8) (Pg 3, lines 4-13) **[Claim 13, 14]**. If further appears in the open bottom resistometer design (reference figures 3 and 1) that the inner tube (6) is longer than the outer tube (5) as set forth in new **Claim 15**.

Speaking on the merits of the disclosed sensor design, Northrup teaches that the sensor is both practical and inexpensive (Pg 3, lines 88-124). The Northrup resistometer performs a functionally equivalent role as the sensor disclosed in the Bell apparatus and is noted for both its practicality and cost effectiveness. In view of the foregoing, the Northrup sensor would have been recognized an obvious substitution for one of ordinary skill in the art seeking a practical and inexpensive temperature measurement apparatus for a glass melt operation.

Regarding **Claim 8**, Bell fails to explicitly indicate the response to a resistivity measurement results in “increasing or decreasing a temperature setpoint” in the processing of the molten glass. Bell does explicitly point to control over temperature as a principle control variable modified in response to the resistance measurement. Since “set point tracking” algorithms and corresponding devices (e.g. PID controllers) are widespread and commonly utilized in most modern manufacturing procedure, it would

have been readily evident to one of ordinary skill in the art at the time of the invention to increase or decrease a "temperature setpoint" in the system in order to control the system temperature.

With respect to **Claim 11**, Bell is silent regarding the disclosed step of adjusting a process parameter in order to "maintain the electrical resistance of the molten glass in a predetermined range or at a predetermined level". Since electrical resistance of the melt is a response variable indicating various properties of the melt (composition/temperature), it would have been obvious to one of ordinary skill in the art at the time of the invention seeking to standardize and/or optimize the product to maintain the melt resistance within a predetermined range. Alternately stated, low variance in the melt resistance would be indicative of a standard composition and/or a standard temperature, both of which may be desirable properties for one seeking to optimize the glass material produced by the system.

To summarize the basis for the rejection, the Bell reference establishes a known relationship between the electrical resistivity of a molten glass and the corresponding temperature and composition of said glass. Bell further teaches that a measured resistance value can be utilized as a response variable in a control system designed to adjust and control other relevant process variables (e.g. temperature, viscosity, and composition of the melt).

As noted above, the Bell reference teaches control over temperature and viscosity of a glass melt. While the reference does not explicitly teach the claimed

control over the surface tension of molten glass, Pietenpol (see figs 3 and 4 excerpts below) provides direct evidence that glass surface tension is directly related to a glass temperature. It follows that the prescribed control over glass temperature as indicated by Bell implicitly results in "control" over the glass surface tension.

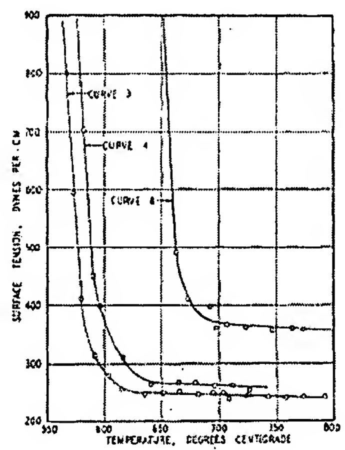


Fig. 3. Variation of surface tension with temperature for the glasses listed in Table I.

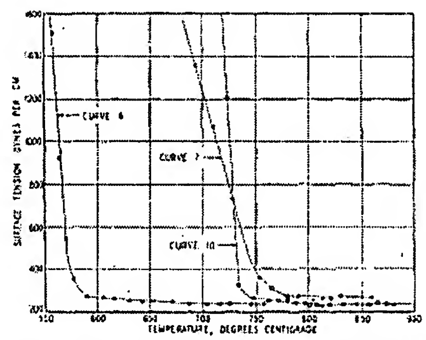


Fig. 4. Variation of surface tension with temperature for the glasses listed in Table I.

Northrup teaches a two electrode resistometer for use in molten glass systems which utilizes the claimed inner and outer tube structure. The disclosed sensor, which is noted as both inexpensive and practical, would have represented an obvious alternative to the Bell electrode arrangement for one of ordinary skill in the art at the time of the invention.

Now with respect to the previously presented **claims 6 and 7** and with particular respect to Applicants newly cited limitation in independent claim 1, the cited references are silent regarding the claimed step of conveying the molten glass to a fiber forming apparatus and the subsequent step of forming a glass fiber from said molten glass.

Varrasso teaches a glass fiber forming bushing which is filled with molten glass. The instant reference explicitly indicates that "the diameter of the fibers produced is

dependent upon the composition of the glass, the temperature of the glass", and other process variables. Since temperature and composition are critical parameters in the quality of fiber produced from a molten glass stock and since Bell teaches electrical resistivity as a proven approach to monitoring both of said variables, incorporating the teachings of Bell and Northrup in the Varrasso process would have been an obvious modification/addition to the disclosed fiber making apparatus. Specifically it would have been obvious to one of ordinary skill in the art who was manufacturing glass fibers as taught by Varrasso to monitor the glass temperature (e.g. directly related to viscosity and surface tension) and composition as instructed by Bell with the electrode arrangement as disclosed by Northrup.

Response to Arguments

Applicant's arguments filed September 10, 2007 have been fully considered but they are not persuasive.

Presents several arguments directed against the Bell reference individually. Specifically, Applicant acknowledges that Bell teaches monitoring variations in melt resistivity in order to control the viscosity and composition of the glass melt. Applicant argues that Bell does discloses neither the formation of a glass fiber from the molten glass nor the control over surface tension of the melt.

With respect to the former argument regarding formation of a glass fiber from the melt, Applicant is reminded that the noted rejection is based upon the combination of prior art teachings under 35 U.S.C. 103(a). In response to applicant's arguments

against the Bell reference individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

With respect to the allegation that Bell does not instruct a measure of control over the surface tension of the glass melt, Examiner is not persuaded. Specifically, as evidenced in the Pietenpol reference (see figs 3 and 4 excerpts above), glass surface tension is a direct function of the glass temperature. It follows that by exerting control over the temperature of the glass melt as instructed in the instant reference, Bell implicitly exerts control over the surface tension of said melt.

A similar argument holds for Applicants allegation that the Varrasso reference fails to teach control over the surface tension of the molten glass. As indicated above, Varrasso teaches tat "the diameter of the fibers produced is dependent upon the composition of the glass, the temperature of the glass". As with the Bell reference, control over the glass melt temperature according to the Varrasso reference implicitly exerts control over the surface tension of the melt since glass melt surface tension is a function of temperature.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason L. Lazorcik whose telephone number is (571) 272-2217. The examiner can normally be reached on Monday through Friday 8:30 am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on (571) 272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JLL

Primary Examiner